IN THE CLAIMS:

This listing of claims will replace all prior versions, and listing, of claims in the application.

Listing of the Claims:

1. (Currently amended) A phased array antenna system with adjustable electrical tilt and having an array of antenna elements, the system incorporating:

   a) a first splitting apparatus for splitting a primary signal into first and second signals,

   b) a variable phase shifter for introducing a variable relative phase shift between the first and second signals,

   c) a second splitting apparatus for dividing the relatively phase shifted first and second signals into respective component signals, and

   d) a signal combining network for forming ~~at least one of~~ vectorial combinations of ~~the~~ component signals ~~and vectorial combinations of the component signals with the first or second signal~~, the second splitting apparatus and the signal combining network being in combination a means for providing drive signals for individual antenna elements, the drive signals consisting at least partly of the said vectorial combinations and varying in phase progressively across the array as a function of antenna element position as required for phased array operation and such that the angle of electrical tilt of the array is adjustable in response to alteration of the variable relative phase shift introduced by the variable phase shifter.

   ~~e) a signal combining network for forming vectorial combinations of the component signals to provide a respective drive signal for each individual antenna element with appropriate phasing relative to other drive signals such that the angle of electrical tilt of the array is adjustable in response to alteration of the variable relative phase shift introduced by the variable phase shifter~~

2. (Original) A system according to Claim 1 having an odd number of antenna elements.

3. (Previously presented) A system according to Claim 1 wherein the variable phase shifter is a first variable phase shifter and the system includes a second variable phase shifter arranged to phase shift a component signal which has been phase shifted by the first variable phase shifter, the second variable phase shifter providing a further component signal output for the signal combining network either directly or via one or more splitter/variable phase shifter combinations.

4. (Previously presented) A system according to Claim 1 wherein the variable phase shifter is a one of a plurality of variable phase shifters, and the signal combining network is arranged to produce antenna element drive signals from component signals some of which have passed through all the variable phase shifters and some of which have not.

5. (Previously presented) A system according to Claim 1 wherein the second splitting apparatus is arranged to divide a component signal into further component signals for input to the signal combining network.

6. (Previously presented) A system according to Claim 1 wherein the signal combining network employs phase shifters and hybrid couplers (hybrids) for phase shifting and forming vectorial combinations.

7. (Original) A system according to Claim 6 wherein the hybrids are 180 degree hybrids.

8. (Original) A system according to Claim 6 wherein the hybrids are ring hybrids with circumference $(n+1/2)\lambda$ and neighbouring ports separated by $\lambda/4$, where n is an integer and λ is a signal wavelength in material of which each ring hybrid is constructed.

9. (Previously presented) A system according to Claim 8 wherein the splitting apparatus incorporates ring hybrids with circumference $(n+1/2)\lambda$ and neighbouring ports separated by $\lambda/4$, one input port of each splitting apparatus hybrid being terminated with a resistor equal to the system impedance and forming a matched load.

10. (Cancelled)

11. (Previously presented) A system according to Claim 1 wherein the second splitting apparatus, variable phase shifter, and the signal combining network are co-located with the antenna element array as an antenna assembly, and the assembly has a single input power feeder for feeding the primary signal to the first splitting apparatus from a remote source.

12. (Previously presented) A system according to Claim 1 wherein the second splitting apparatus incorporates first and second splitters, the first splitting apparatus is located with the variable phase shifter remotely from the second splitting apparatus, the second splitting apparatus, the signal combining network and the antenna array are co-located as an antenna assembly, and the assembly has dual input power feeders for feeding the first and second signals to the antenna assembly from a remote source at which the first splitting apparatus and variable phase shifter are located.

13. (Previously presented) A system according to Claim 1 wherein the variable phase shifter is a first variable phase shifter connected in a transmit channel, and the system includes a second variable phase shifter connected in a receive channel and further transmit and receive channels providing fixed phase shifts, and the signal combining network is arranged to operate in both transmit and receive modes by producing antenna element drive signals in response to signals in the transmit channels and producing receive channel signals from signals developed by antenna elements operating in receive mode, the system having independently adjustable electrical tilt in both transmit and receive modes.

14. (Previously presented) A system according to Claim 1 wherein the variable phase shifter is one of a plurality of variable phase shifters associated with respective operators, and the system includes filtering and combining apparatus for routing signals on to common signal feed apparatus after phase shifting in respective variable phase shifters, the common signal feed apparatus being connected to the second splitting apparatus and a the

signal combining network for providing signals to the antenna array containing contributions from both operators with independently adjustable electrical tilt.

15. (Previously presented) A system according to Claim 14 wherein the plurality of variable phase shifters comprises a respective pair of variable phase shifters associated with each operator, and the system has components to which have both forward and reverse signal processing capabilities such that the system is operative in transmit and receive modes with independently adjustable electrical tilt in each mode.

16. (Currently amended) A method of adjusting the electrical tilt of a phased array antenna system, the system including an array of antenna elements, the method comprising the steps of:

a) splitting a primary signal into first and second signals,

b) introducing a variable relative phase shift between the first and second signals,

c) dividing the relatively phase shifted first and second signals into respective component signals, and

d) forming ~~at least one of~~ vectorial combinations of ~~the~~ component signals ~~and vectorial combinations of the component signals with the first or second signal,~~ to provide respective drive signals for individual antenna elements, the drive signals consisting at least partly of the said vectorial combinations and varying in phase progressively across the array as a function of antenna element position as required for phased array operation and such that the angle of electrical tilt of the array is adjustable in response to alteration of the variable relative phase shift.

17. (Original) A method according to Claim 16 wherein the array has an odd number of antenna elements.

18. (Previously presented) A method according to Claim 16 including the step of generating at least one component signal having a phase shift applied collectively by a plurality of variable phase shifters.

19. (Previously presented) A method according to Claim 18 wherein the variable phase shifters are ganged, and the method includes producing antenna element drive signals from component signals some of which have a phase shift applied collectively by all the variable phase shifters, and some of which have not.

20. (Previously presented) A method according to Claim 16 including the step of dividing a component signal into further component signals for forming additional vectorial combinations to provide more antenna element drive signals.

21. (Previously presented) A method according to Claim 16 employing phase shifters and hybrids for phase shifting and forming vectorial combinations of the component signals.

22. (Original) A method according to Claim 21 wherein the hybrids are 180 degree hybrids.

23. (Previously presented) A method according to Claim 21 wherein the hybrids are ring hybrids with circumference $(n+1/2)\lambda$ and neighbouring input and output ports separated by $\lambda/4$, where n is an integer and λ is a signal wavelength in material of which each ring hybrid is constructed.

24-25. (Cancelled)

26. (Previously presented) A method according to Claim 16 including the step of feeding the primary signal as a single input signal from a remote source for splitting, variable phase shifting and forming vectorial combinations in a network co-located with the antenna array ~~to~~ and forming therewith an antenna assembly.

27. (Previously presented) A method according to Claim 16 including the step of feeding the first and second signals with variable phase relative to one another from a remote source to an antenna assembly for splitting and forming vectorial combinations in a network co-located with the antenna array.

28. (Previously presented) A method according to Claim 16 employing transmit and receive channels for operation in both transmit and receive modes, and including producing antenna element drive signals in response to transmit channel signals and producing receive channel signals from signals developed by antenna elements operating in receive mode with independently adjustable electrical tilt in both transmit and receive modes.

29. (Previously presented) A method according to Claim 16 wherein the variable phase shift is one of a plurality of variable phase shifts, the first and second signals are a signal pair, the pair is one of a plurality of pairs of relatively phase shifted signals, and each variable phase shift and pair is associated with a respective operator, and the method includes:

a) filtering and combining signals and passing them to common signal feed apparatus after phase shifting in respective variable phase shifters for implementation of the steps of dividing and forming vectorial combinations;

b) providing signals to the array containing contributions from each operator; and

c) adjusting electrical tilt associated with each operator independently.

30. (Previously presented) A method according to Claim 29 wherein the plurality of variable phase shifts is implemented by a respective pair of variable phase shifters associated with each operator, the method employs components which have both forward and reverse signal processing capabilities, and the method includes operating in transmit and receive modes with independently adjustable electrical tilt in both modes.

31. (Previously presented) A system according to Claim 6 wherein the hybrids are designed to convert input signals I1 and I2 into vector sums and differences other than (I1+I2) and (I1-I2).

32. (Previously presented) A method according to Claim 21 wherein the hybrids are designed to convert input signals I1 and I2 into vector sums and differences other than (I1+I2) and (I1-I2).

33. (Previously presented) A method according to Claim 21 wherein the step of dividing the relatively phase shifted first and second signals into component signals employs ring hybrids each having:

d) circumference $(n+1/2)\lambda$

e) neighbouring ports separated by $\lambda/4$, and

f) an input port terminated with a resistor equal to the system impedance and forming a matched load where n is an integer and λ is a signal wavelength material of which each ring hybrid is constructed.